

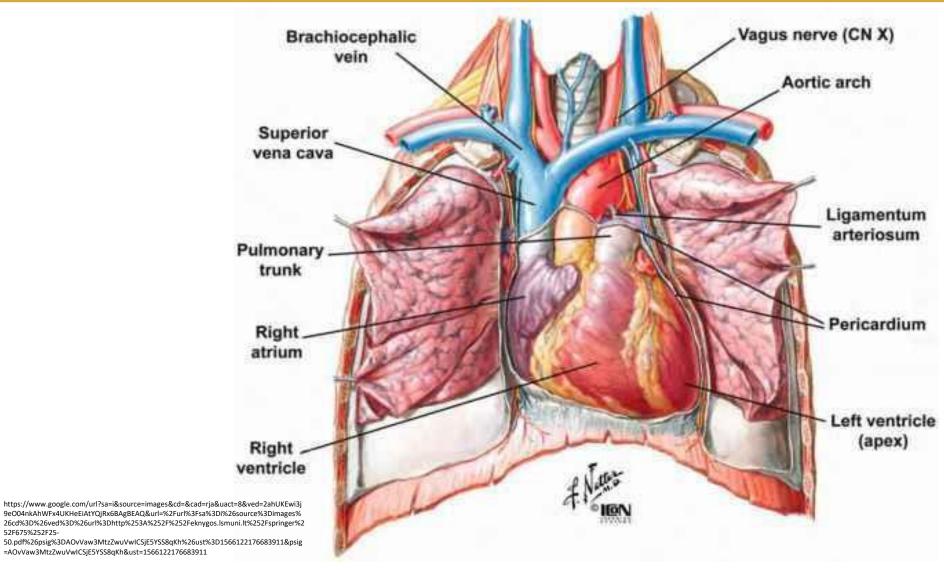
# **Armed Forces College of Medicine AFCM**



## **Cardiology Study Guide**

### **Definition**



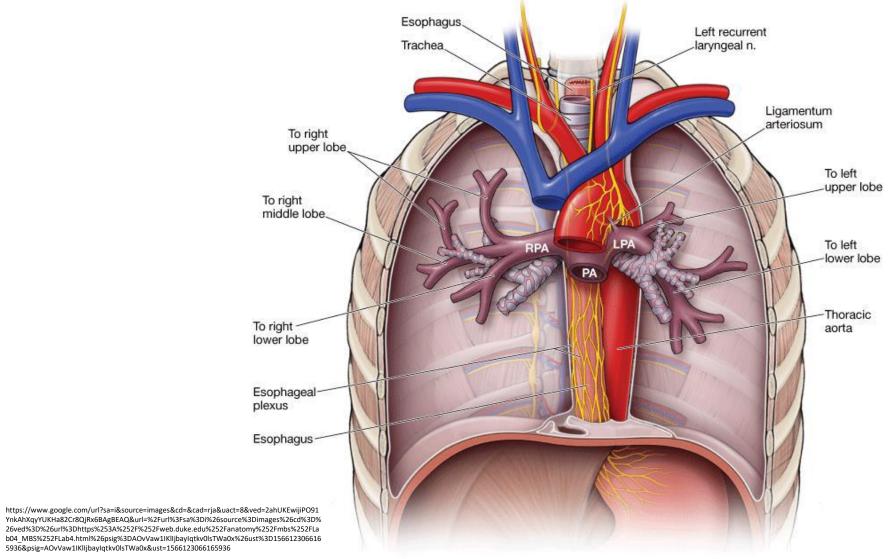


52F675%252F25-

=AOvVaw3MtzZwuVwICSjE5YSS8qKh&ust=1566122176683911

### **Definition**





**Anatomy Department** 

### **Boundaries & Divisions**



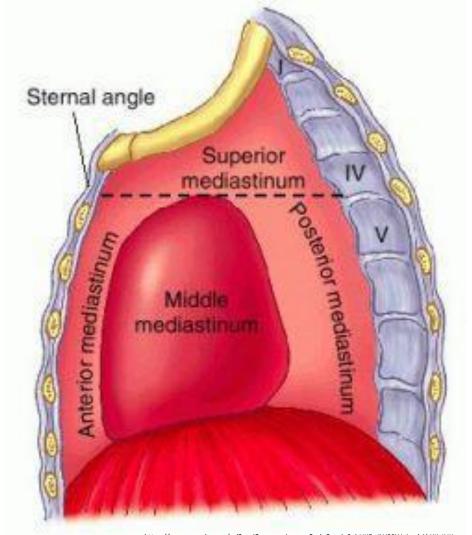
**Anteriorly:** sternum & costal cartilage

**Posteriorly:** bodies of T1-T12

**Superiorly:** plane of thoracic inlet.

Inferiorly: diaphragm.

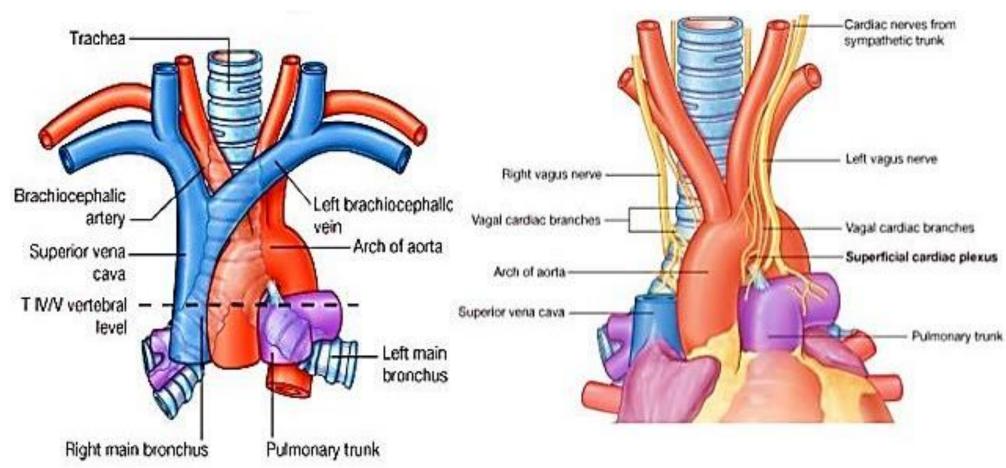
Lateraly: Rt & Lt Pleural sacs



https://www.google.com/url?sa=i&source=images&cd=&ved=2ahUKewjW09WsJonkAhXKxIUK HVpeDvQQJRx6BAgBEAQ&url=https%3A%2F%2Fsocratic.org%2Fquestions%2Fin-what-cavityithe-mediastinum-located&psig=ADvVaw3UN2B 6ie E2NtZG m bZu&ust=1566122940447659

### **Superior Mediastinum**

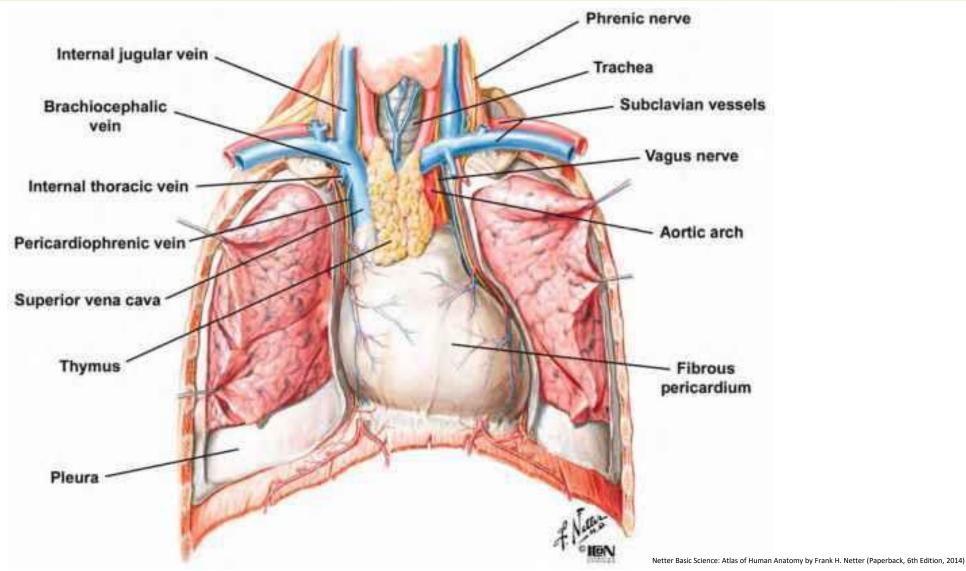




https://www.google.com/url?sa=i&source=images&cd=&ved=2ahUKEwiQnIPA14nkAhUKhxoKHR rWBUQQjRx6BAgBEAQ&url=https%3A%2F%2Fwww.slideshare.net%2Frongon28us%2Fmediastinu m-25993031&psig=AOvVaw3JwpsyAkcNsKdSdnV9TJcm&ust=1566123614377100

### **Anterior Mediastinum**

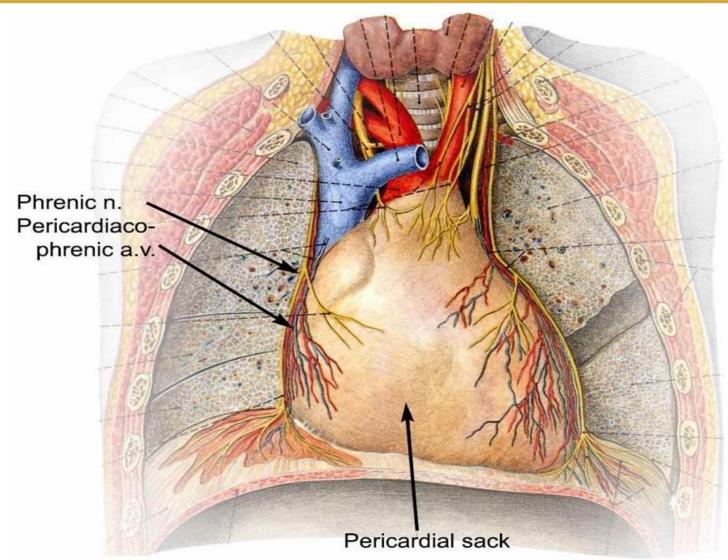




Anatomy Department

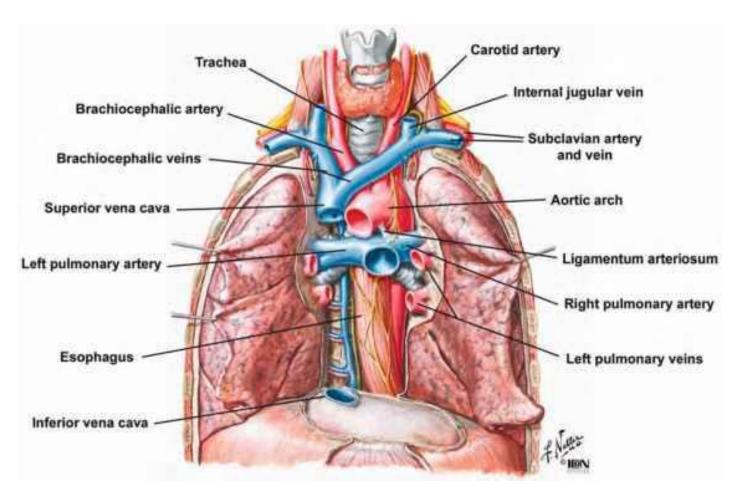
### **Middle Mediastinum**

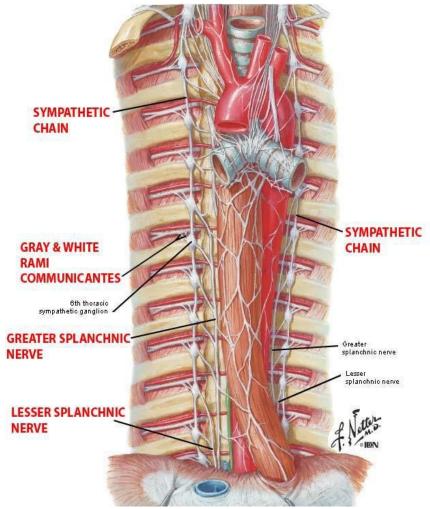




### **Posterior Mediastinum**



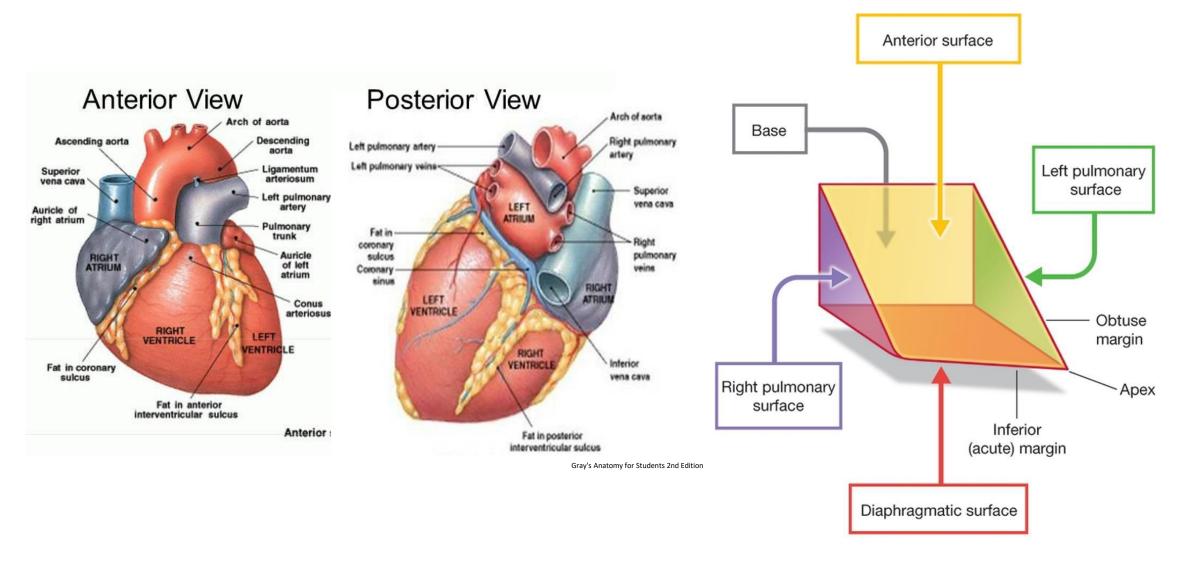




Netter Basic Science: Atlas of Human Anatomy by Frank H. Netter (Paperback, 6th Edition, 2014)

#### External feature of the heart





#### **Border of the Heart**

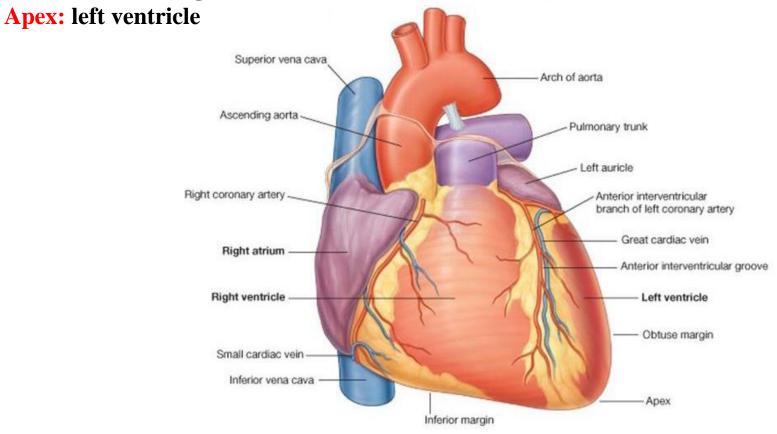


**Borders of the Heart** 

**Right border:** right atrium

**Left border:** left auricle and left ventricle

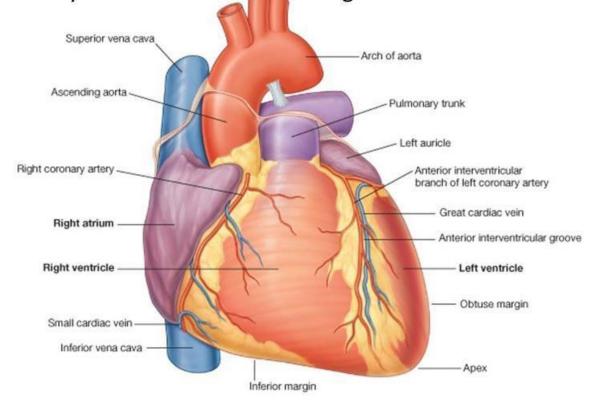
**Inferior border:** right ventricle



#### **Surfaces of the Heart**



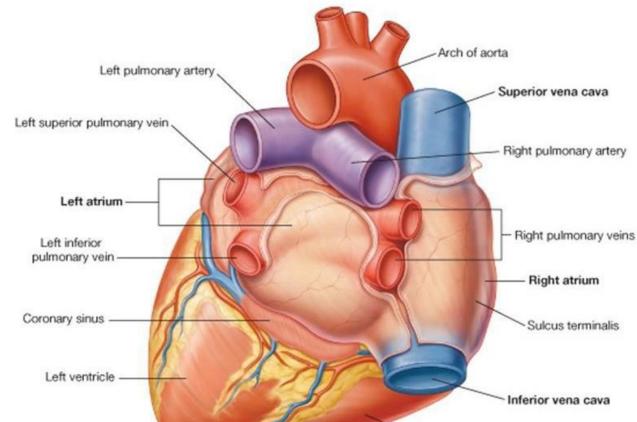
Sternocostal (Anterior) surface: is formed mainly by right atrium and right ventricle, which are separated from each other by vertical atrioventricular groove. Right border is formed by right atrium; left border, by left ventricle and part of left auricle. Right & left ventricles are separated by anterior interventricular groove.



#### **Surfaces of the Heart**



Base of heart, or (posterior surface): is formed mainly by left atrium, into which open four pulmonary veins. The base of heart lies opposite apex.



Right ventricle

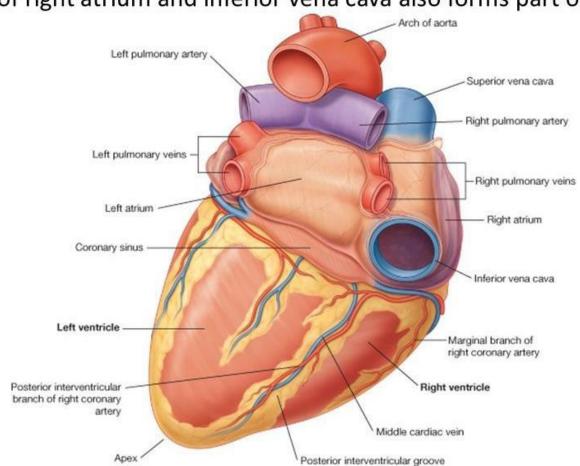
Apex

#### **Surfaces of the Heart**



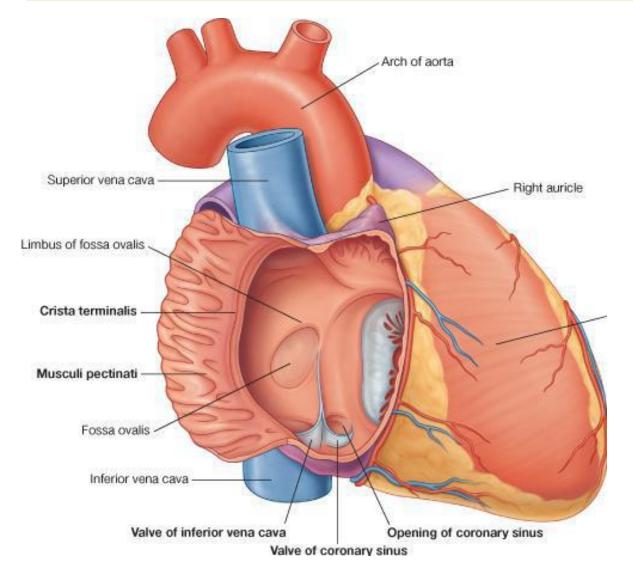
**Diaphragmatic (inferior) surface**: is formed mainly by right and left ventricles separated by posterior interventricular groove. Inferior surface of right atrium and inferior vena cava also forms part of this surface.

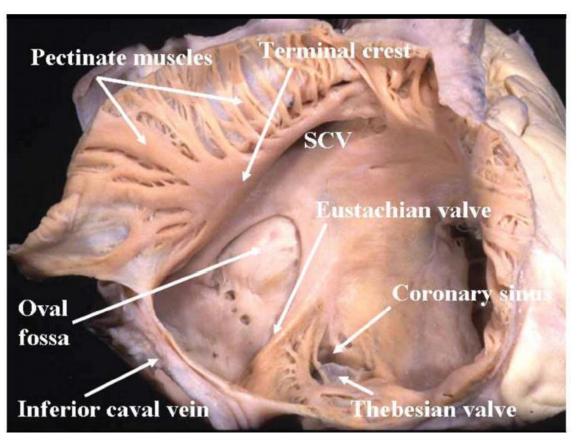
Arch of aorta



### **Internal feature of the heart (Rt Atrium)**

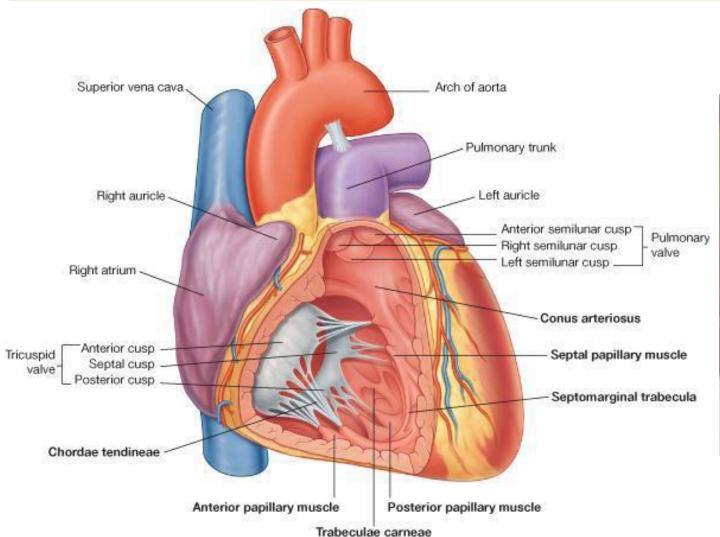


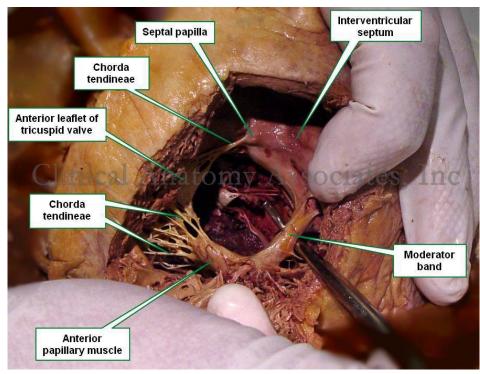




### **Internal feature of the heart (Rt ventricle)**

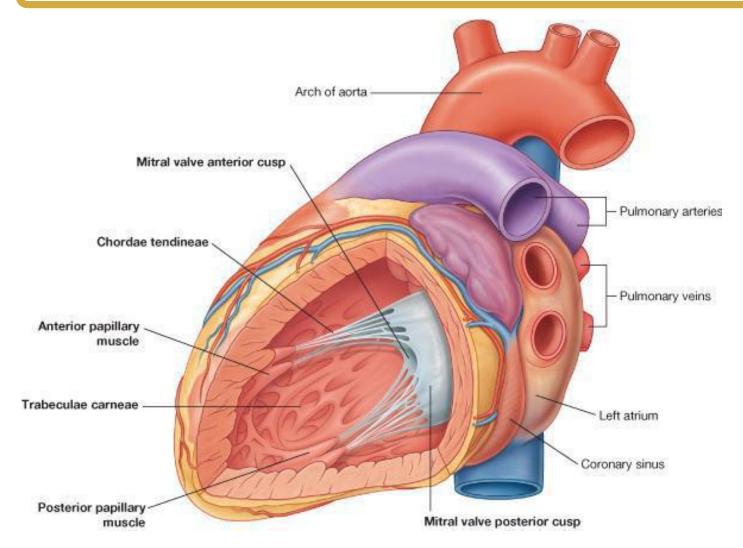


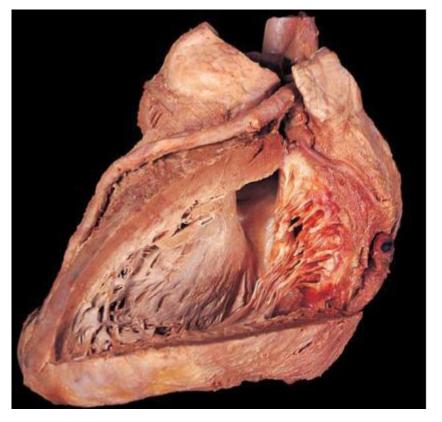




### Internal feature of the heart (Lt ventricle)

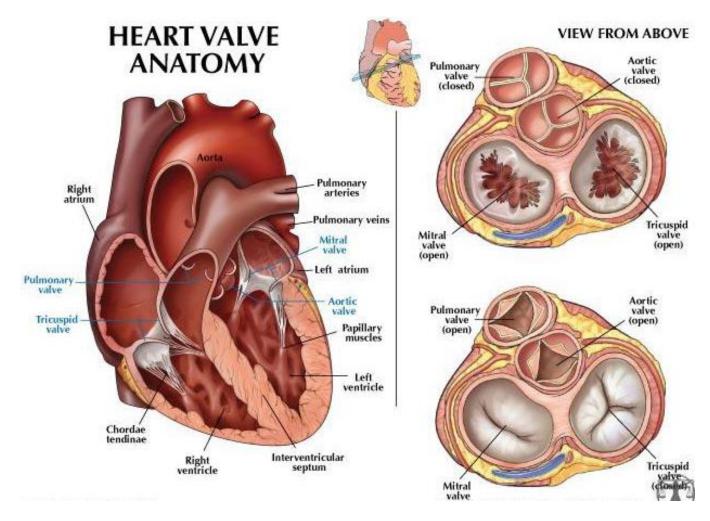






### **Cardiac valves**





### **Ascending Aorta**

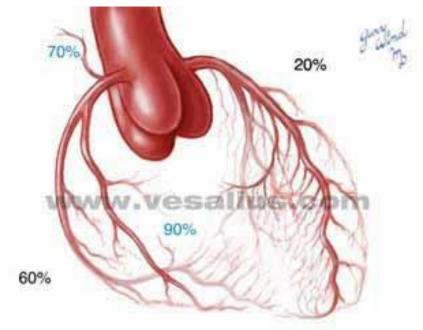


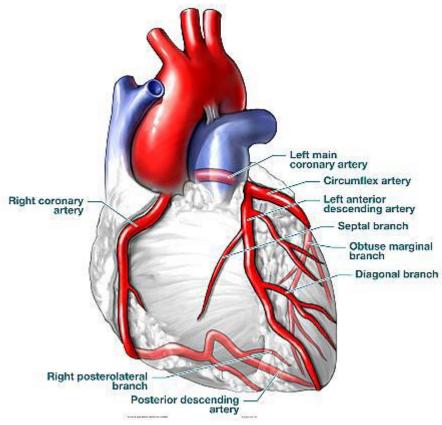
- •Begins at 3rd Lt. costal cartilage
- •Ends at 2nd Rt. costal cartilage
- •5cm long

#### **Branches:**

1.Rt. Coronary

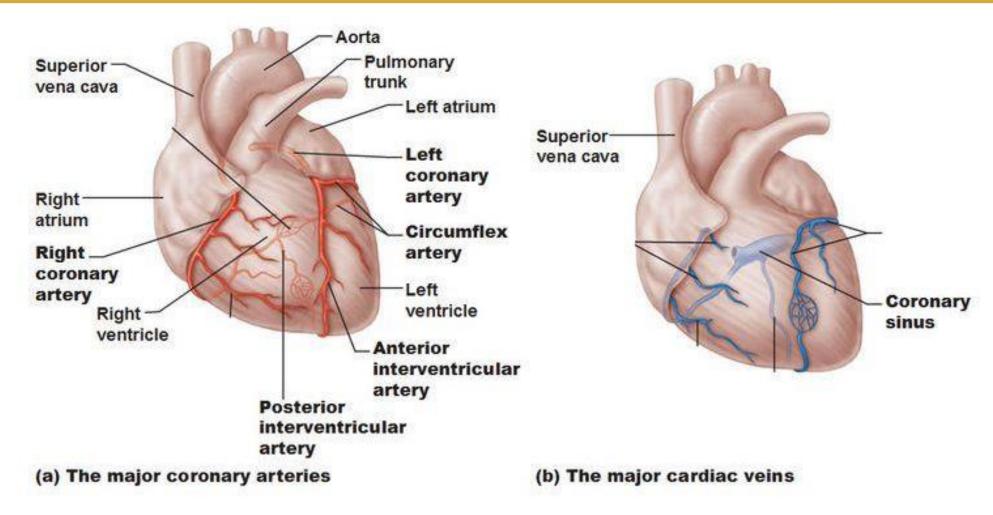
2.Lt. coronary observe tl and distribution





### Blood supply of the heart





https://i.pinimg.com/originals/6c/98/91/6c98915b3652021c2e9d32fbc7f0d756.jpg

### Arterial supply of the heart

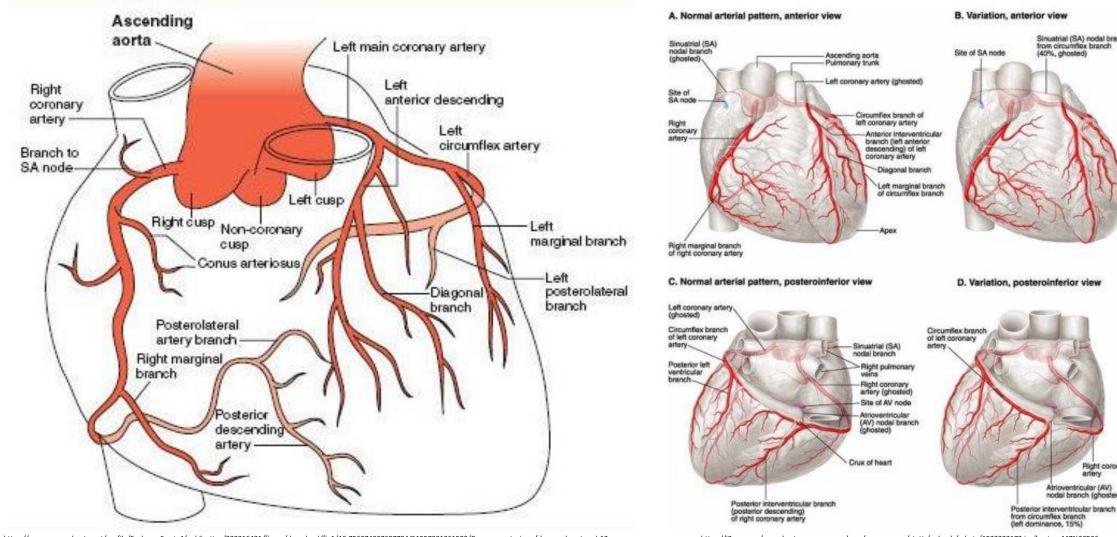


Sinuatrial (SA) nodal branch from circumflex branch

Right coronary

Atrioventricular (AV) nodal branch (ghosted)

(40%, ghosted)

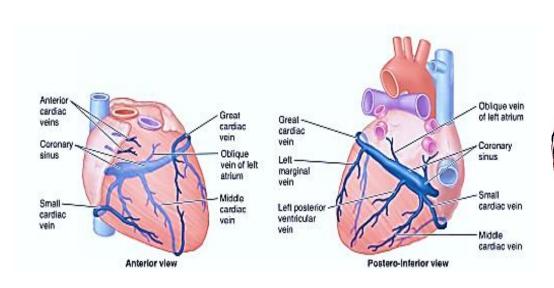


https://www.researchgate.net/profile/Sushree Swain4/publication/322216431/figure/download/fig1/AS:756274337697794@1557321261503/Coronary-arteries-of-human-heart-and-12standard-ECG-leads-in-different-planes.jpg

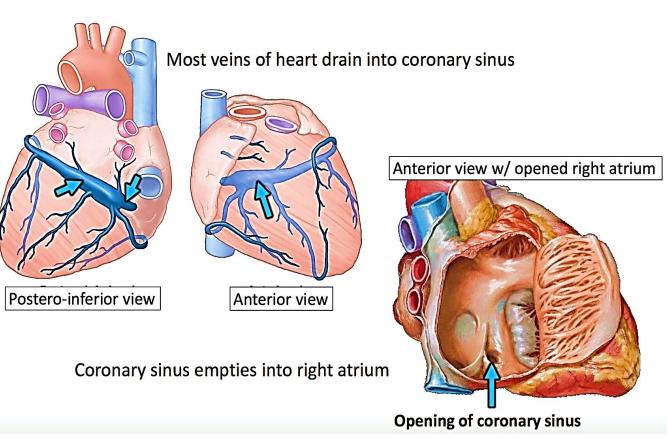
https://i2.wp.com/www.bestexamapps.com/own/appmanager/static/uploads/admin/1522322173.jpg?resize=447%2C536

### Venous Drainage of the heart





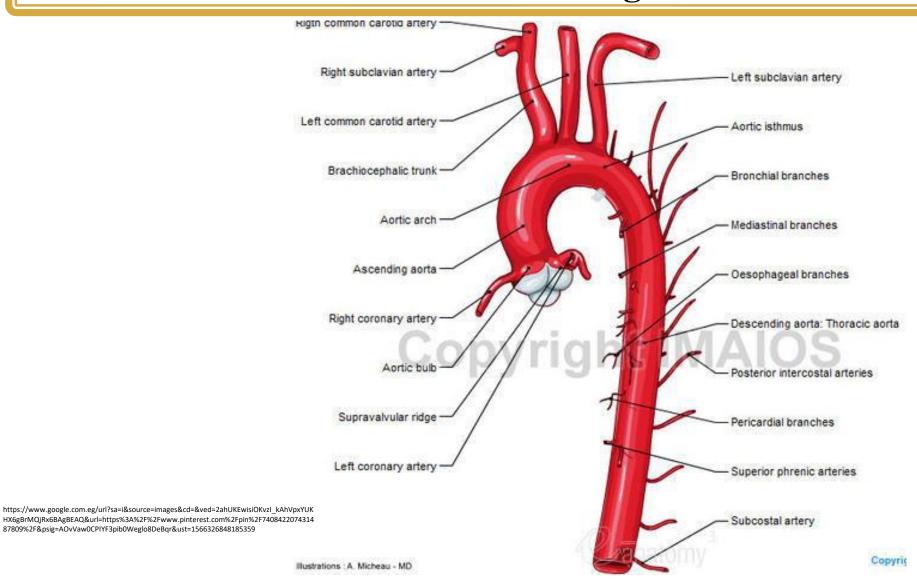
https://prorenataid.files.wordpress.com/2019/01/cardiac-veins.png?w=658&h=274



https://d1yboe6750e2cu.cloudfront.net/i/0e42cdf3d4df4554140390c8636857997e0888f0

### **Descending Aorta**





**Anatomy Department** 

87809%2F&psig=AOvVaw0CPIYF3pib0Weglo8DeBqr&ust=1566326848185359

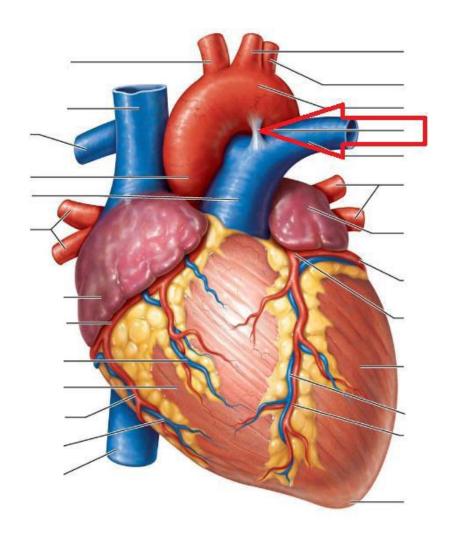
### **Pulmonary trunk**



- •Begins at 3rd Lt. costal cartilage
- •Ends at 2nd Lt. costal cartilage By dividing into two pulmonary arteries
- •5cm long

#### **Branches:**

- 1.Rt. Pulmonary artery (longer)
- 2.Lt. Pulmonary artery (observe ligamentum arteriosum)



### **Brachiocephalic veins**



#### **Rt brachiocephalic:**

•2.5 cm, vertical

#### Lt brachiocephalic:

•6cm, crosses from Lt. to Rt.

#### **Tributaries:**

#### Common:

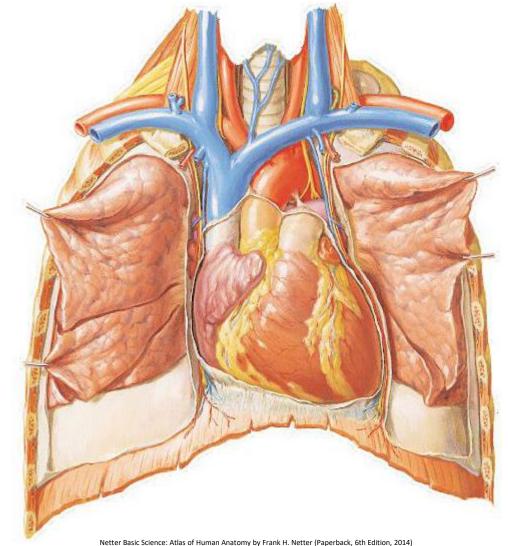
- 1. IJV, subclavian vein
- 2. Inf. Thyroid vein, vertebral vein & internal thoracic vein
- 3. 1st posterior intercostal v.

#### **Special to:**

Lt. Brachiocephalic: Thoracic duct, LT. superior

intercostal

Rt. Brachiocephalic: Rt. Lymphatic duct



### **SVC**

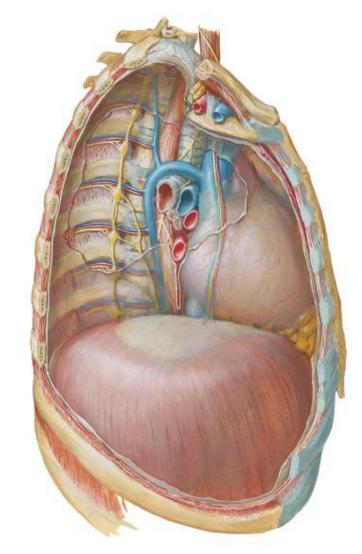


#### **SVC:**

- •Begins post. To 1st Rt. costal cartilage by union of brachiocephalic veins
- •Terminates post. To 3rd Rt. Costal cartilage by opening into Rt. Atrium

#### **Tributaries:**

- •Brachiocephalic veins
- •Azygos vein opposite 2nd Rt. Costal cartilage

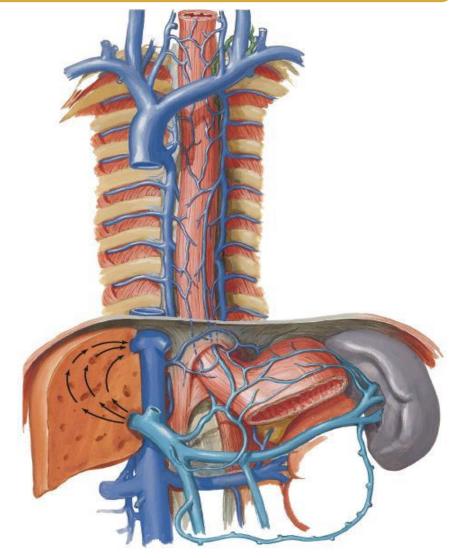


### **IVC**



#### **IVC:**

- •Pierce central tendon of diaphragm to Enter thoracic cavity 1" to Rt. of midline at T8 level
- •Terminates post. To 6th Rt. Costal cartilage by opening into Rt. atrium



Netter Basic Science: Atlas of Human Anatomy by Frank H. Netter (Paperback, 6th Edition, 2014)

### Carotid system



Common carotid:

Origin:

Rt CC brachiocephalic artery

Lt CC aortic arch

Cervical part

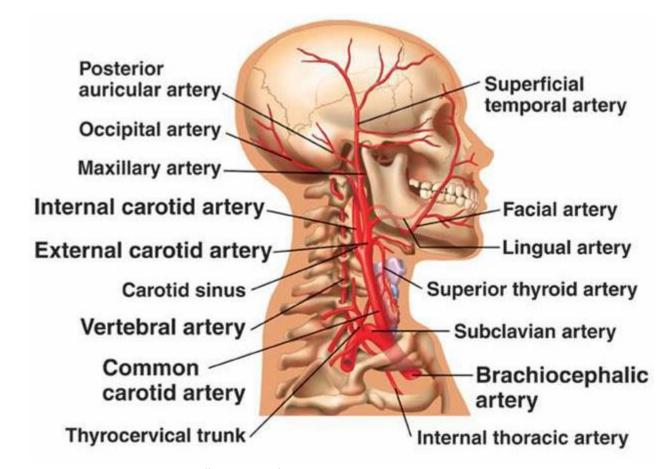
begins:

Sternoclavicular joint

Ends:

upper border of thyroid cartilage, disc between C3 &C4

At bifurcation: Carotid sinus



https://www.google.com.eg/imgres?imgurl=http%3A%2F%2Fajsapslabs.weebly.com%2Fuploads %2F5%2F2%2F2%2F0%2F52205665%2F6666223\_orig.jpg&imgrefurl=https%3A%2F%2Fajsapslabs .weebly.com%2Fmore-on-cardiovascular-

system.html&docid=Gsj6ytrdMxngxM&tbnid=u08bAEkWdnieIM%3A&vet=10ahUKEwj67PT64Y\_k
AhWsVRUIHVmtBbcQMwiZASgZMBk..i&w=624&h=468&hl=en&bih=767&biw=1600&q=Carotid%
20system%20&ved=0ahUKEwj67PT64Y\_kAhWsVRUIHVmtBbcQMwiZASgZMBk&iact=mcRuact=8

### Subclavian artery



#### Origin:

Rt Subclavian brachiocephalic artery

Lt Subclavian aortic arch

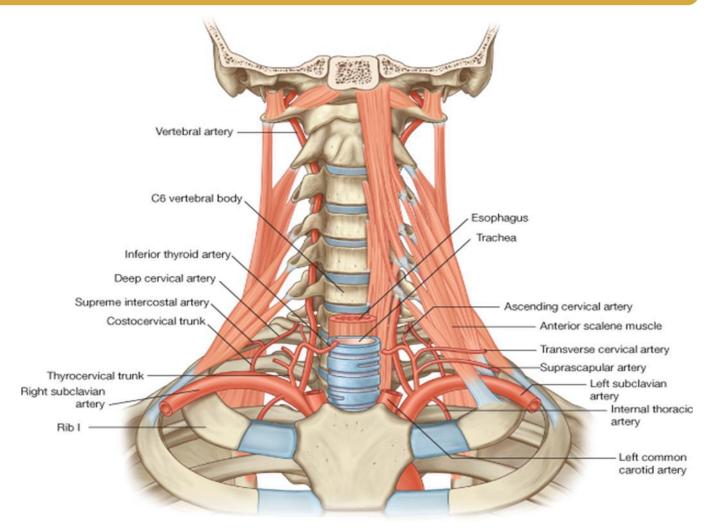
Cervical part

Begins:

Sternoclavicular joint

Ends:

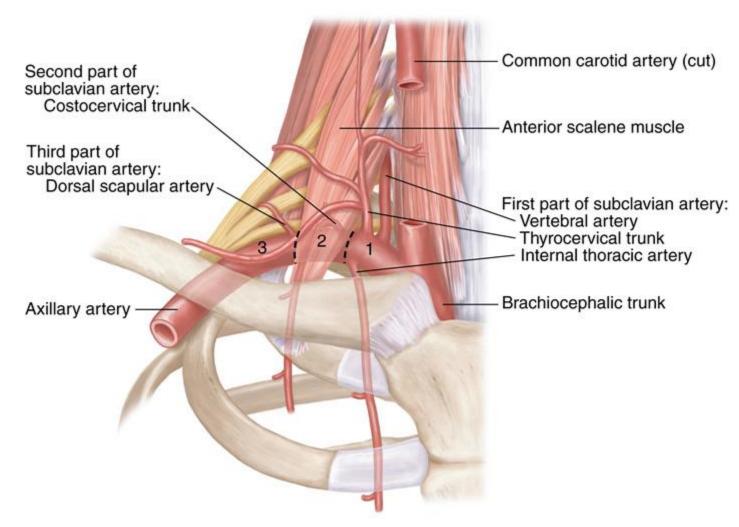
Outer border of 1st rib



© Elsevier. Drake et al: Gray's Anatomy for Students - www.studentconsult.com

### Subclavian artery

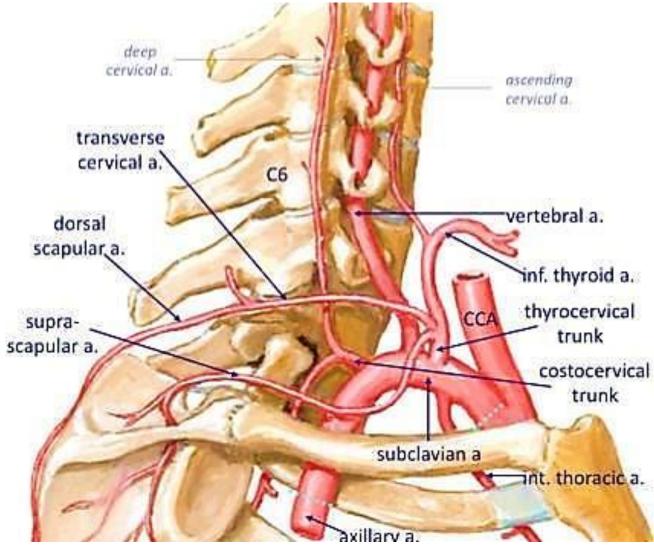




https://www.google.com.eg/url?sa=i&source=images&cd=&ved=2ahUKEwjup-P34o\_kAhUIx4UKHXNzDV0QjRx6BAgBEAQ&url=https%3A%2F%2Fweb.duke.edu%2Fanatomy%2FLab21\_table.html&psig=AOvVaw0VX0z9rlxT64feZZ7E8Yn1&ust=1566332879530598

### Branches of Subclavian artery





https://i.pinimg.com/originals/34/2b/18/342b185120e8b471e4c461429cebf303.jpg

#### Veins of Neck



#### External Jugular Vein:

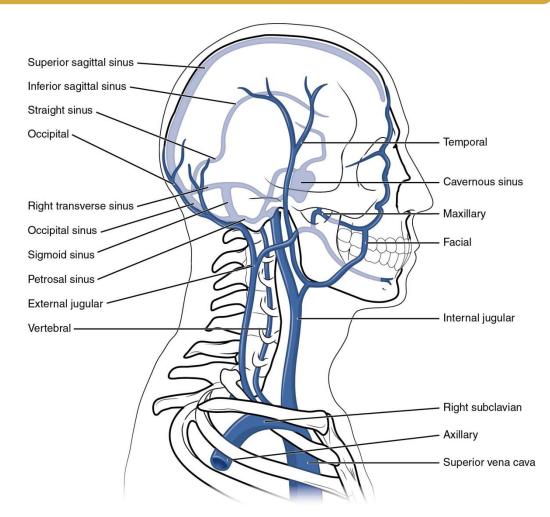
Begins: union of post. Auricular + post devision of

retromandibular

**Ends**: in subclavian

#### Tributaries:

- 1. Anterior jugular vein
- 2. Transverse cervical vein
- 3. Suprascapular vein



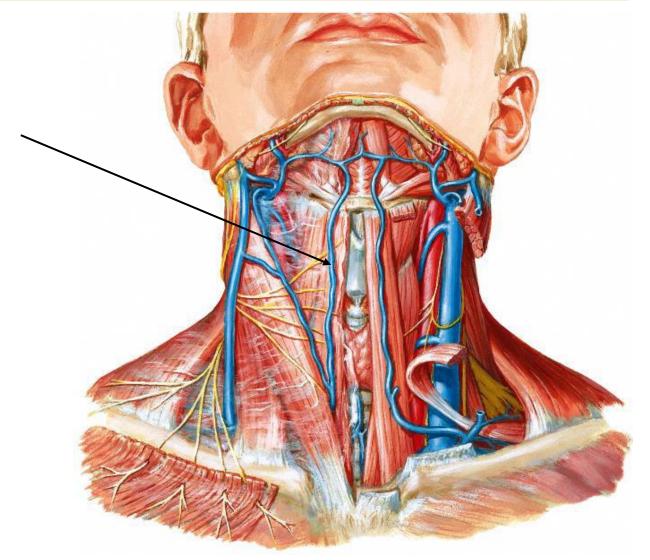
### Veins of Neck



Anterior Jugular Vein:

Begins: submental venous plexus

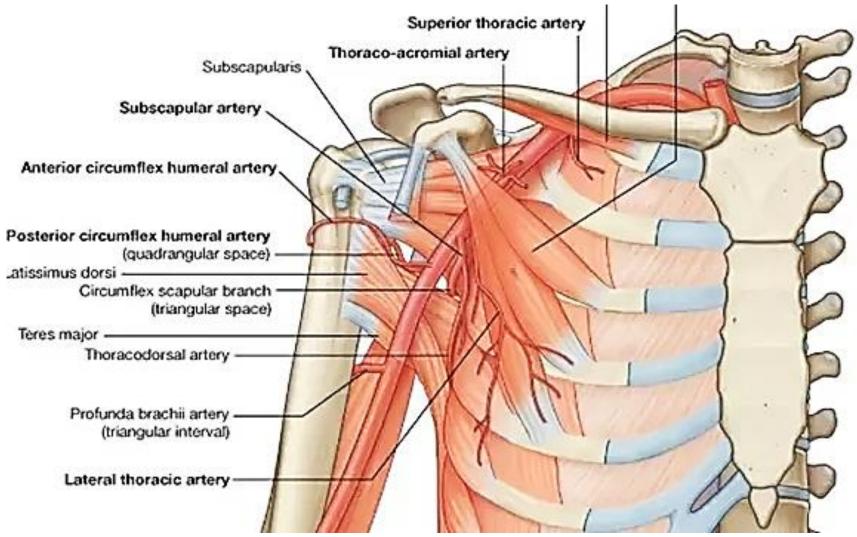
**Ends**: in EJV



Netter Basic Science: Atlas of Human Anatomy by Frank H. Netter (Paperback, 6th Edition, 2014)

### Axillary artery





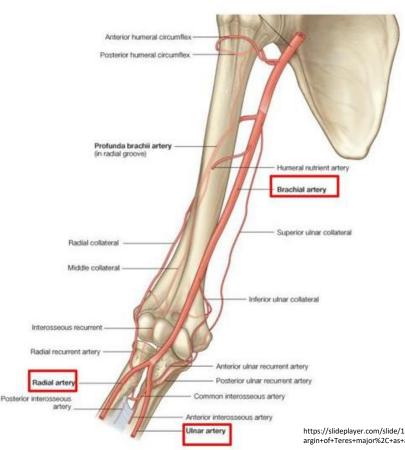
https://gph.fs.guoracdn.net/main-qimg-e3ae4aca79a43e639b31d595744fe3c7.webj

### Brachial artery



- Begins at the lower margin of Teres major, as a continuation of the axillary artery
- Major Branches
- Profunda Brachial,
- Superior and Inferior Ulnar collateral arteries.
- Muscular.
- Nutrient to the humerus.
- Terminates opposite the neck of radius by dividing unto the Radial and Ulnar Arteries,

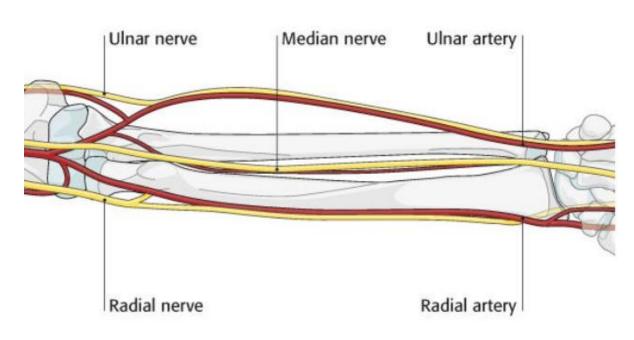
# **Brachial Artery**



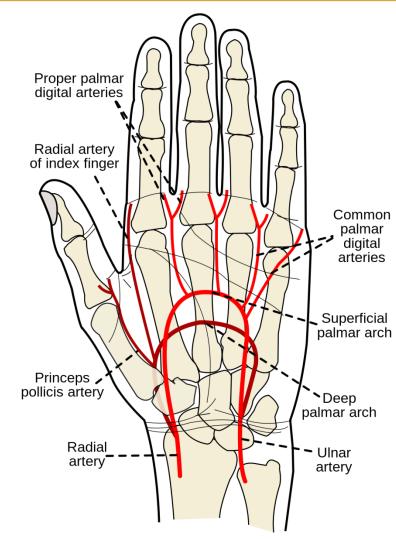
https://slideplayer.com/slide/13092872/79/images/6/Brachial+Artery+Begins+at+the+lower+margin+of+Teres+major%2C+as+a+continuation+of+the+axillary+artery...jpg

### Radial & Ulnar arteries





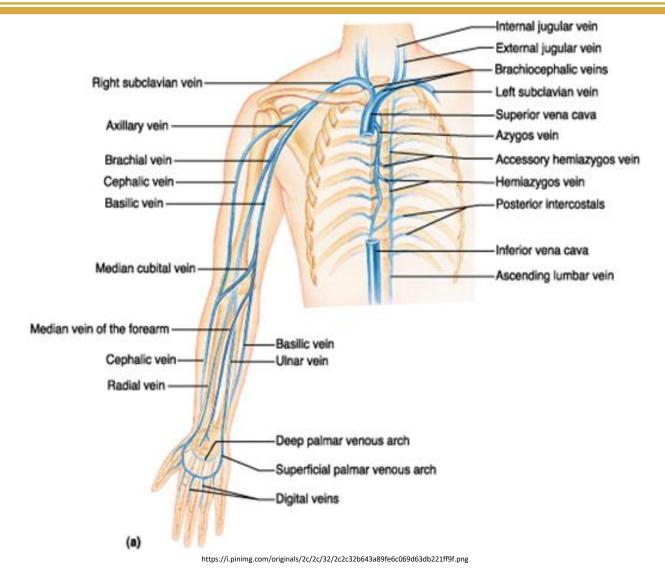
https://image.slidesharecdn.com/bloodsupplyofupperlimbpart2-180413130845/95/blood-supply-of-upper-limb-part2-8-638.jpg?cb=1523625470



https://upload.wikimedia.org/wikipedia/commons/thumb/a/a9/Gray1237.svg/1200px-Gray1237.svg.png

## Veins of the upper limb

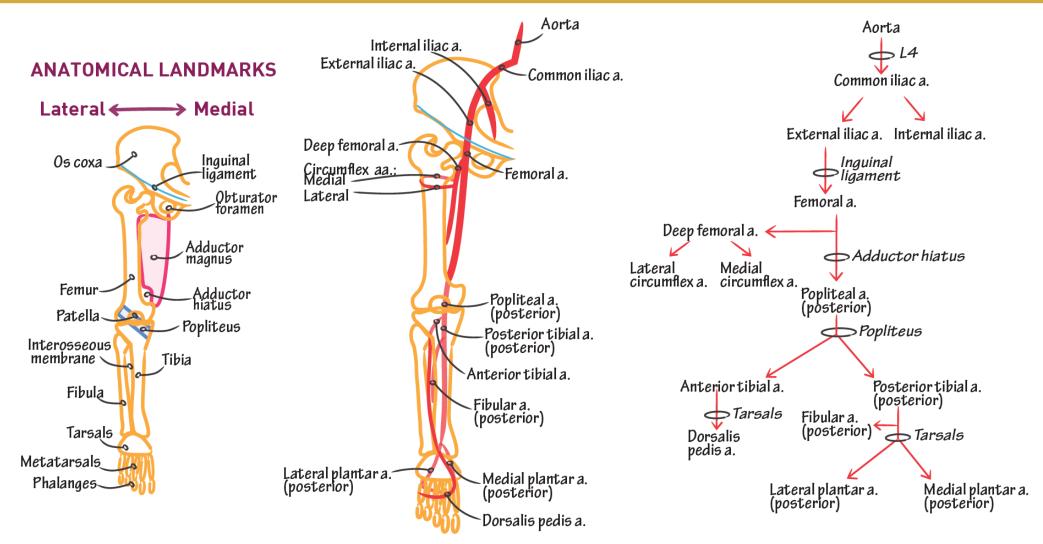




Anatomy Department

#### Arteries of the lower limb

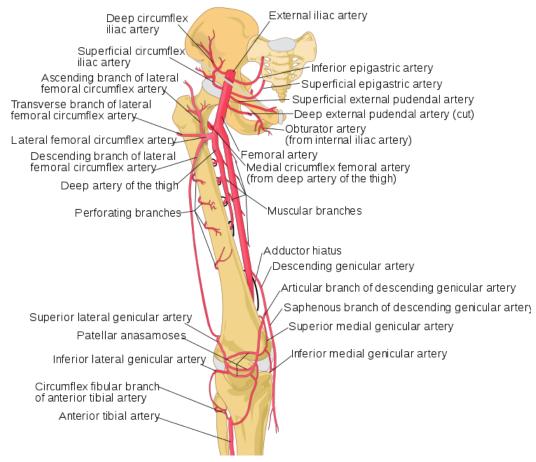




#### Femoral artery



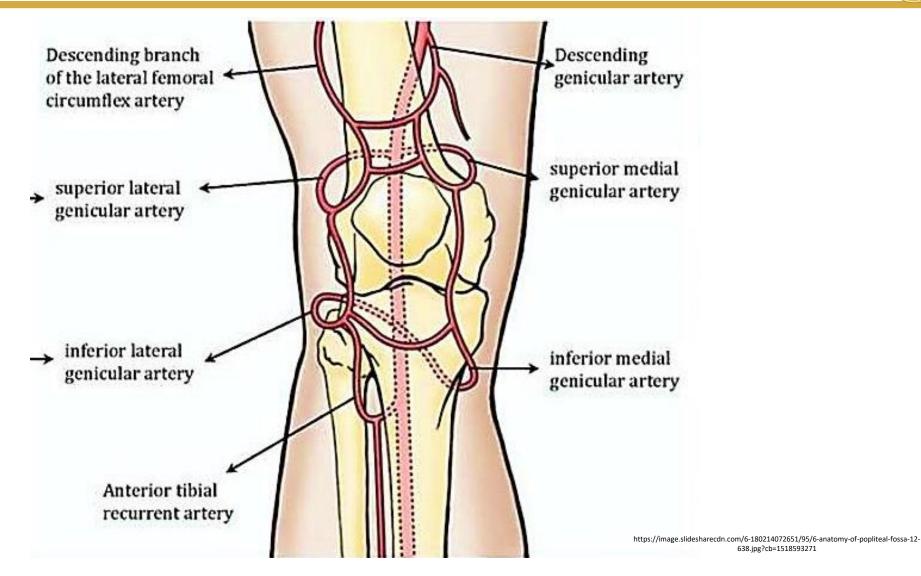
Superficial br.	Deep br.
<ol> <li>Superficial epigastric a.</li> <li>Superficial external pudendal a.</li> </ol>	<ol> <li>Deep external pudendal a.</li> <li>Profunda femoris a.</li> </ol>
3. Superficial circumflex iliac a.	3. Descending genicular a.



https://upload.wikimedia.org/wikipedia/commons/thumb/c/cd/Thigh\_arteries\_schema.svg/750px-Thigh\_arteries\_schema.svg.png

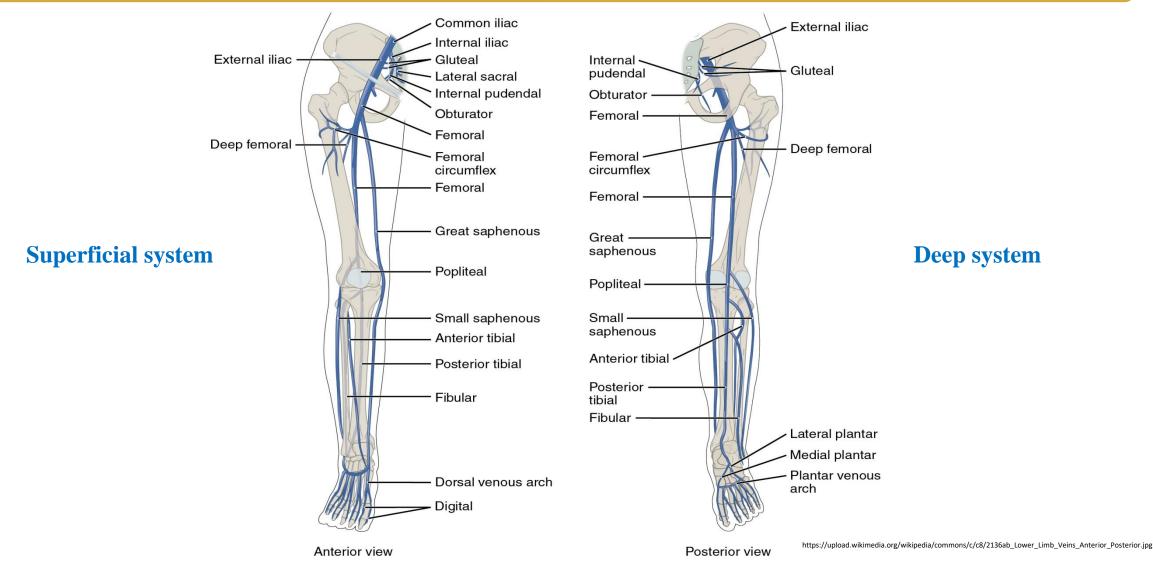
## Popliteal artery





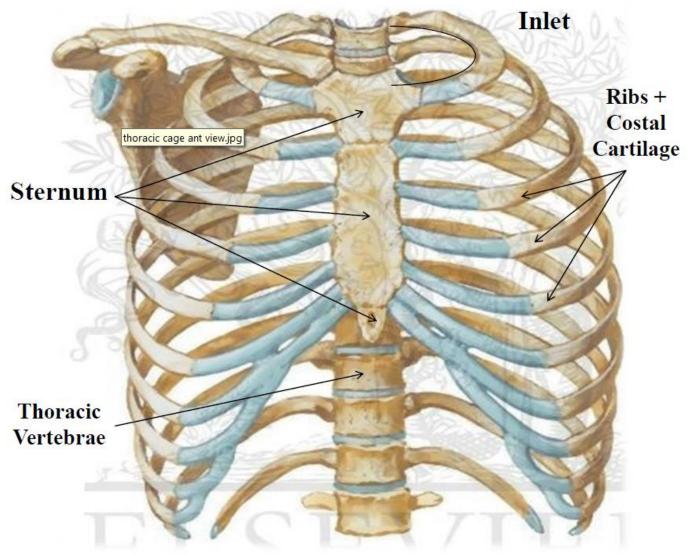
#### Veins of the lower limb





## **Sternum**



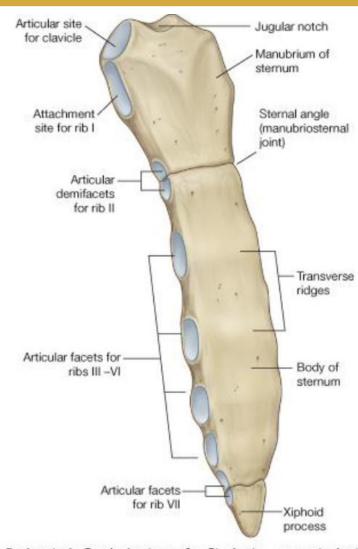


Netter Basic Science: Atlas of Human Anatomy by Frank H. Netter (Paperback, 6th Edition, 2014)

#### **Sternum**



#### Sternum

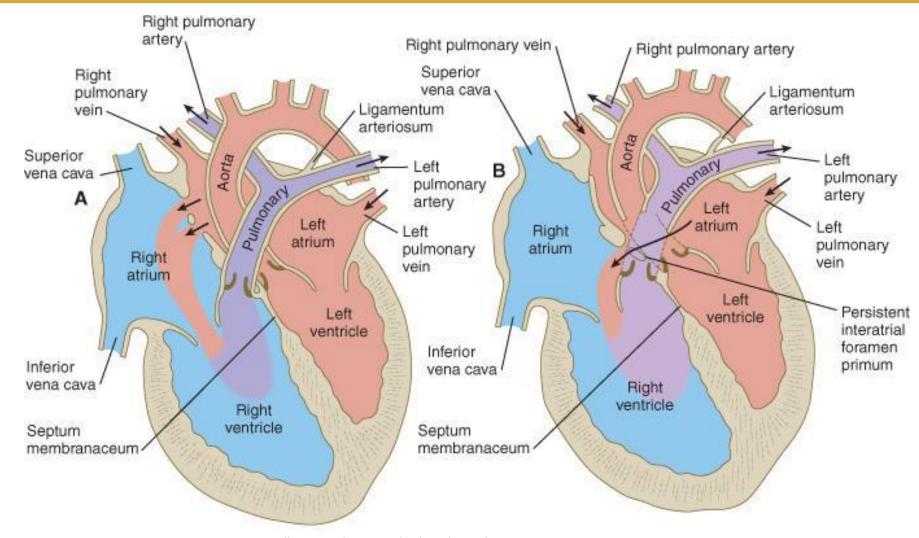


© Elsevier. Drake et al: Gray's Anatomy for Students - www.studentconsult.com

Anatomy Department

#### ASD (atrial septal defect)

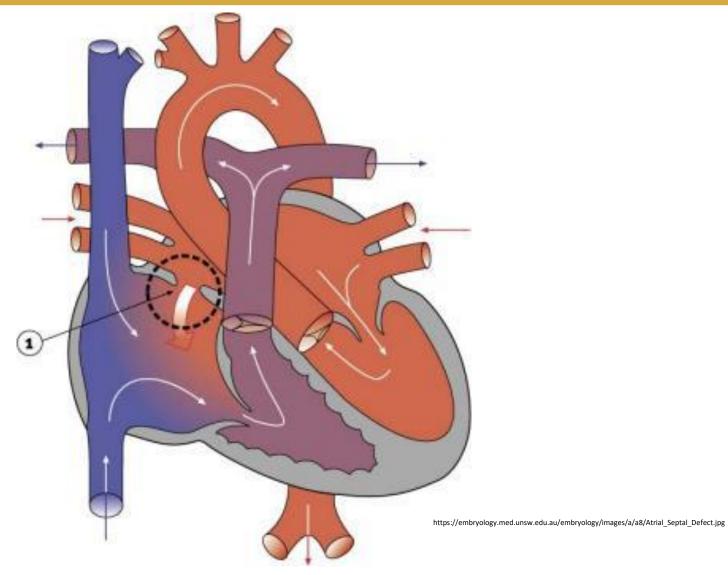




 $https://www.rch.org.au/uploadedImages/Main/Content/cardiology/4a\_Atrioventricular\_septal\_defect\_AV\_Canal\_defect.jpg$ 

## ASD (atrial septal defect)

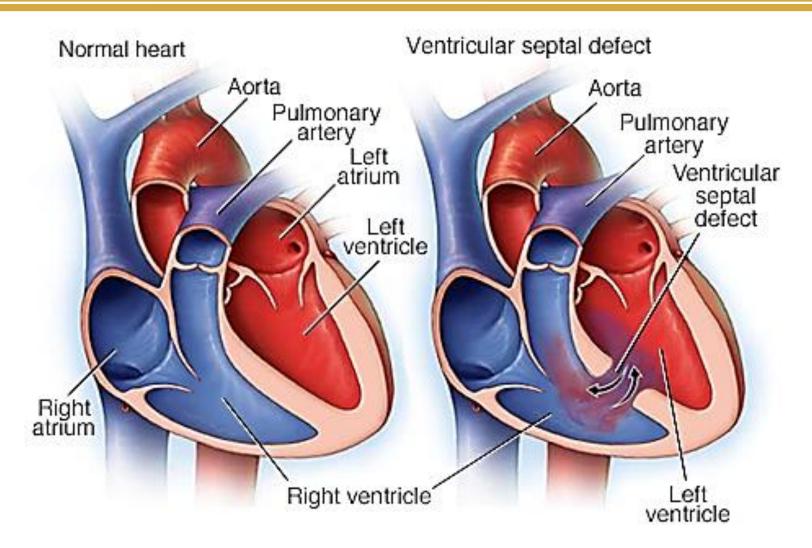




**Anatomy Department** 

#### VSD (ventricular septal defect)

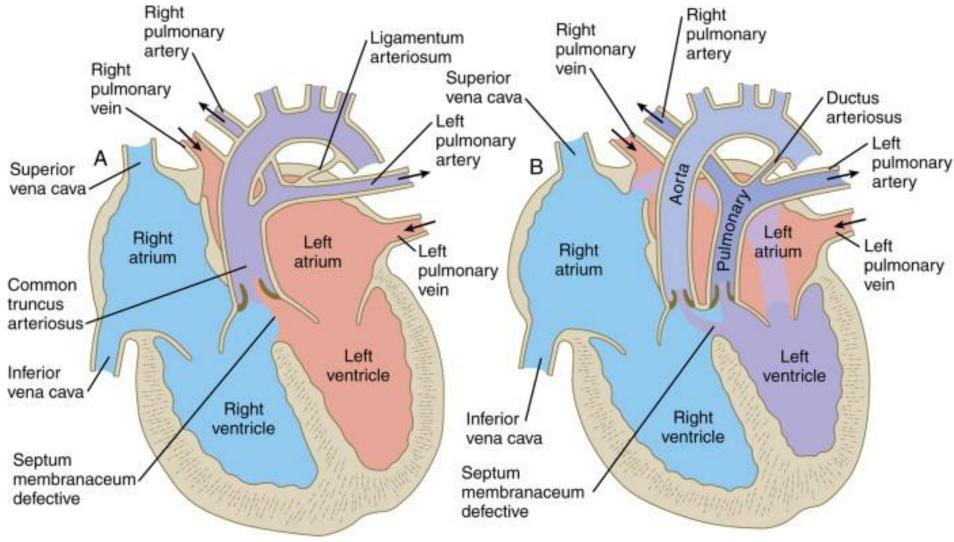




https://www.mayoclinic.org/-/media/kcms/gbs/patient-consumer/images/2013/08/26/10/47/ds00614 ds00998 im02680 r7 ventseptdefthu jpg.jpg

#### Persistant trunkus arteriosus

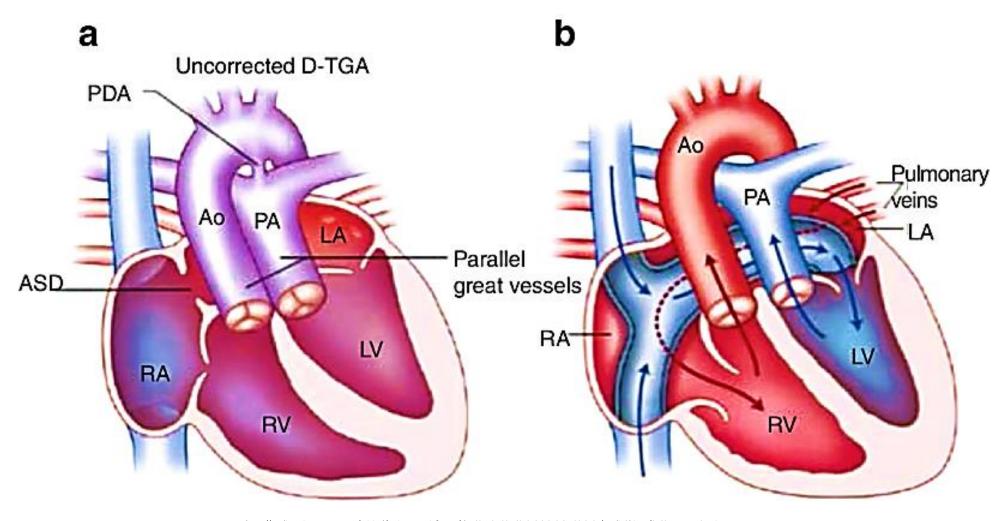




https://ars.els-cdn.com/content/image/3-s2.0-B978012801238305460X-f05460-18-9780128012383.jpg

## Transposition of great vessels

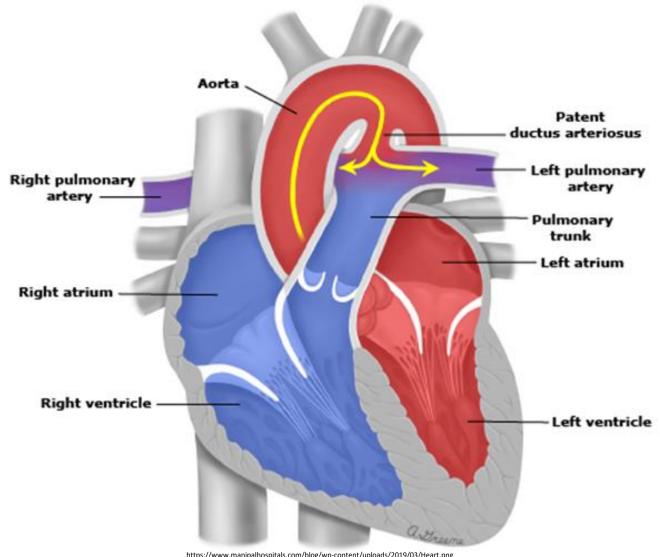




 $https://media.springernature.com/original/springer-static/image/chp%3A10.1007\%2F978-3-319-67420-9\_25/MediaObjects/346917\_1\_En\_25\_Fig1\_HTML.png$ 

#### Patent ductus arteriosus

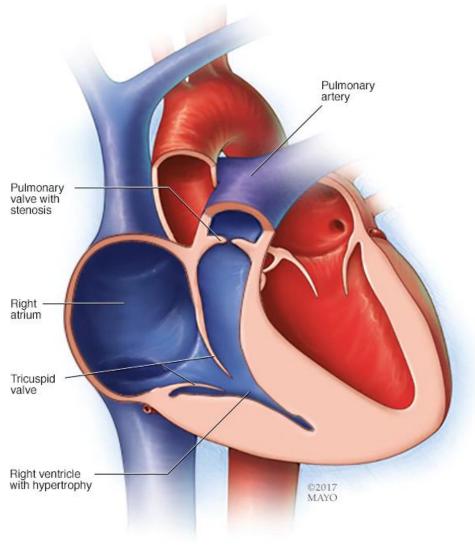




 $\label{lem:https://www.manipalhospitals.com/blog/wp-content/uploads/2019/03/Heart.png} \\ Anatomy\ Department$ 

## Pulmonary Stenosis

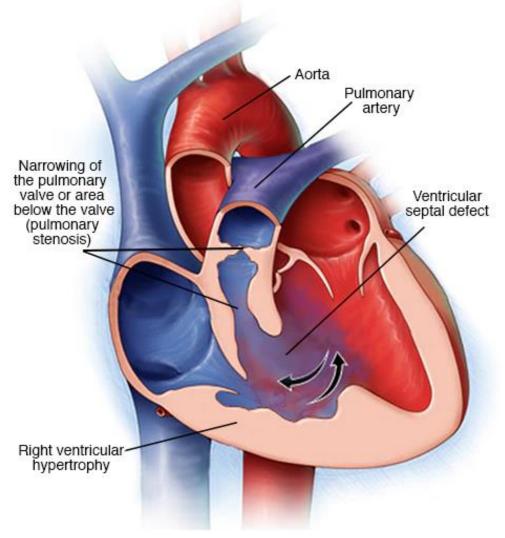




 $\label{lem:https://www.mayoclinic.org/-/media/kcms/gbs/patient-consumer/images/2017/12/05/18/46/\_r7\_pulmonarystenosis-8col.jpg \\ Anatomy Department$ 

## Fallot's tetralogy

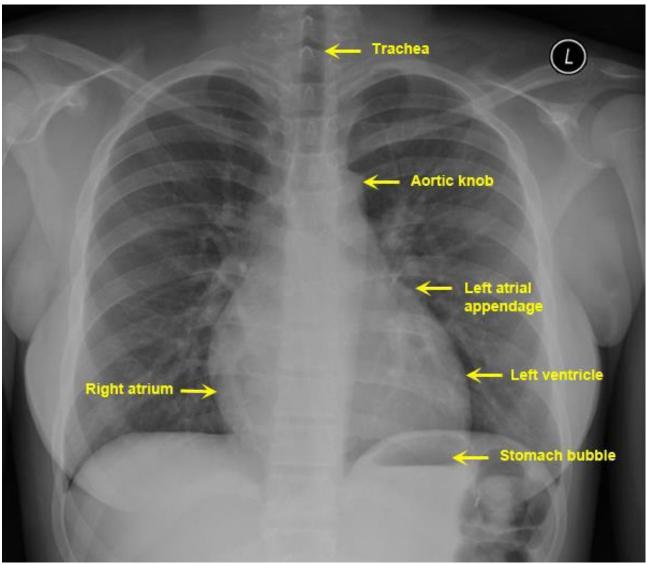




 $https://www.mayoclinic.org/-/media/kcms/gbs/patient-consumer/images/2013/08/26/09/48/ds00615\_ds00998\_im00438\_r7\_tetralogythu\_jpg.jpg$ 

## **Cardiac Imaging**

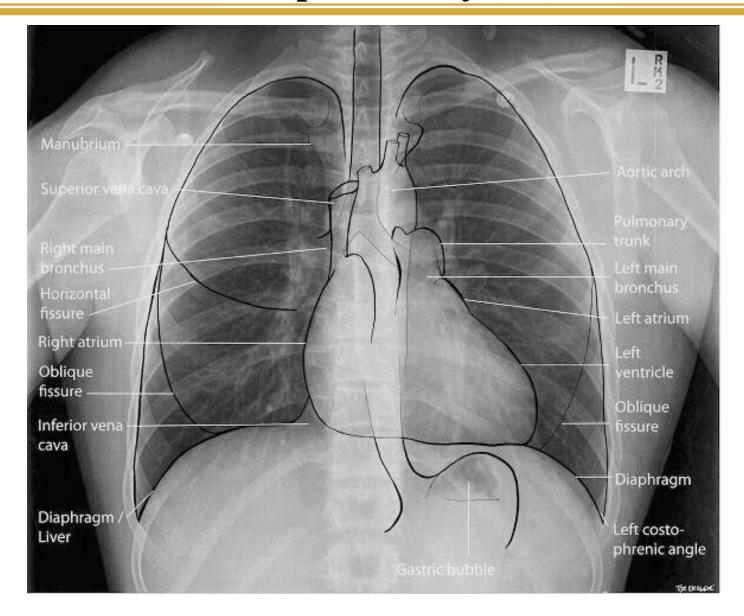




radiopaedia.org

## Chest plain X-ray (PA)

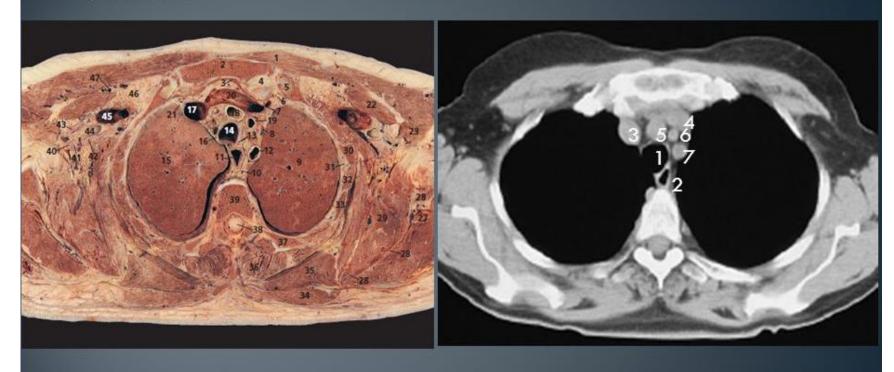




#### **Chest CT scan (mediastinal window)**



# Cross sectional Anatomy on CT T3 level



1-trachea

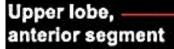
4-left brachiocephalic vein

6-left common carotid artery

2-oesophagus 3-right braciocephalic vein 5-right brachiocephalic artery 7-left subclavian artery

## Chest CT scan (lung window) level T4



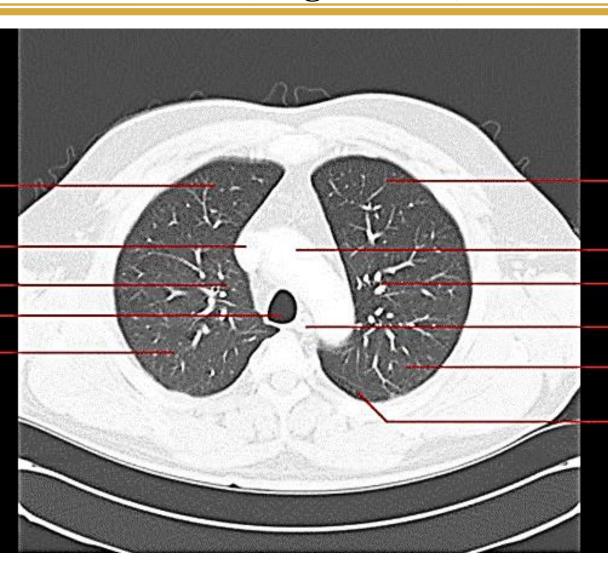


Superior vena cava

Upper lobe, apical segment

Trachea

Upper lobe, posterior segment



Upper lobe, anterior segment

Upper lobe, apical segment

Esophagus

Aortic arch

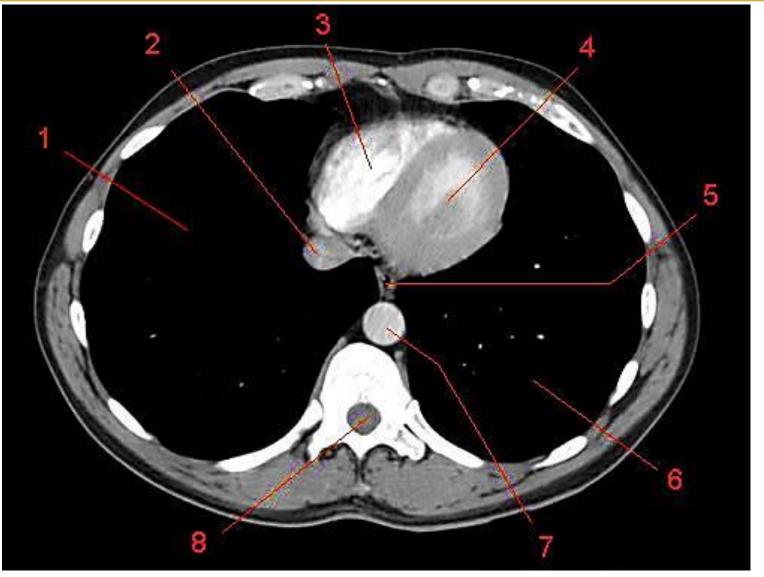
Upper lobe, posterior segment Lower lobe,

superior segment

#### Chest CT scan (mediastinal window) level T7

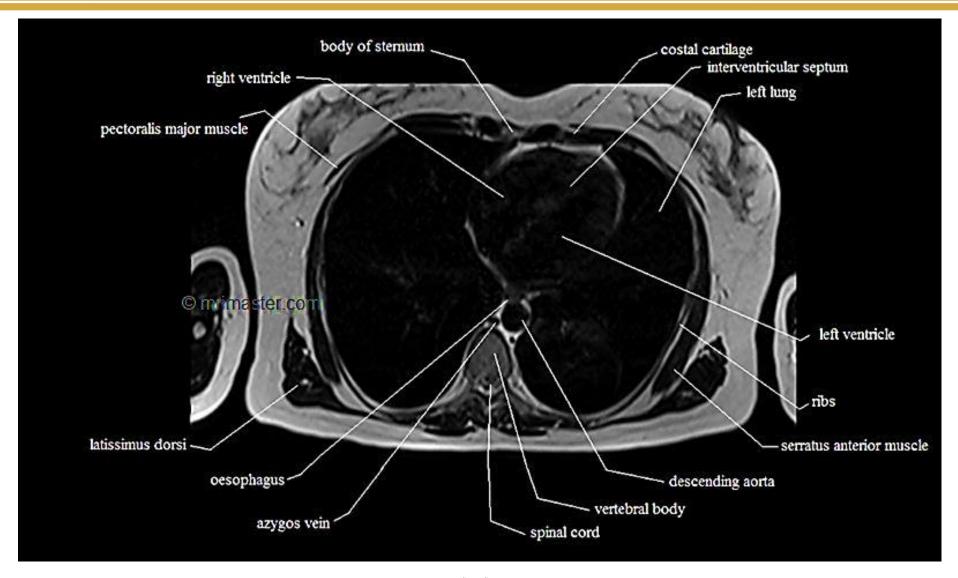


1.Rt lung 2.Rt atrium 3.Rt ventricle 4.Lt ventricle 5.Lt atrium 6.Lt lung 7.Aorta 8.T7 vert.



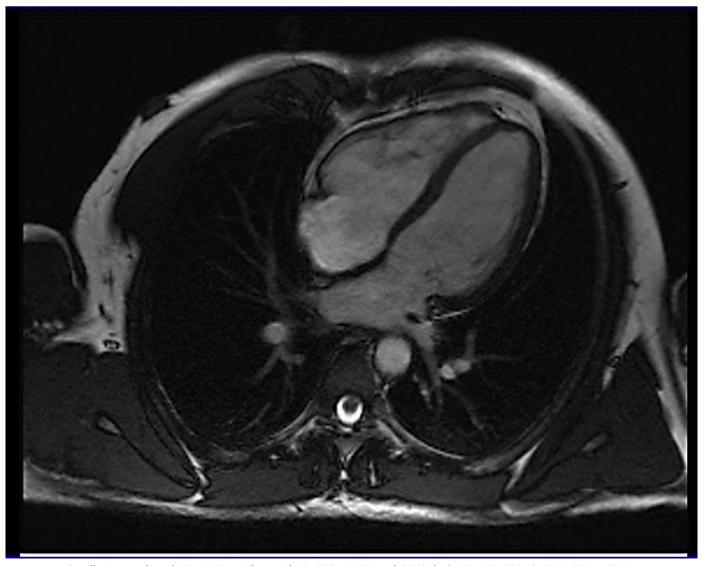
#### Chest MRI (Black blood) level T7





## Cardiac MRI (white blood) 4 champers view





https://mrimaster.com/images/POSSITION%20BUTTON/PLANNING/cardiac%20planning%20images/4ch%20dya/cardiac%20mri%204%20chamber%20cine%20image%201.jpg

## **Best Wishes**